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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

July 3, 1937

Eclipse Pyrotechnics

See Page 8

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

The most stiffening starch can be made from cannas.

Cow's milk contains more vitamin D in summer than in winter.

Daylight saving is now used in summer by 30 million people in the United States.

Feathers of the indigo bunting look brown under a microscope, but when the bird flies they look blue.

It takes more oil to lubricate motor vehicles in the United States than to keep industrial machinery running.

A new device to measure the vibration of airplane parts can be used to set up artificial vibrations in any part of the plane.

The famous rock profile of the Old Man of the Mountains in New Hampshire needs repairs with cement and iron work, to keep the rock of the forehead from slipping.

The sense of smell is rated the most primitive of the special senses.

The Soviet Union is now producing almost as much gold as South Africa.

Nearly half of the cases of whooping cough occur in children under two years old.

Air conditioning of buildings is causing an increased demand on public water supplies.

A new kind of electric light wall plug is set at an angle, so that the cord will lie close along the wall.

A new Chicago department store has in its walls bands of glass block, which can be turned into bands of color at night by lighting inside the building.

Psychologists find that small brothers and sisters are most apt to be jealous of one another if there is from one and one-half to four years difference between their ages.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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ZOOLOGY

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GENERAL SCIENCE

Aid of Science Imperative in Democracy's Fight to Survive

Leaders of American Science Present Symposium Of Agreeing Opinions at Meeting in Denver

HOW CAN science save democracy? In the non-public meetings of officers of the American Assocation for the Advancement of Science in Denver last week, this problem was discussed concretly, with some concern as to the methods by which science can be made to serve the people as a whole.

Concern in Europe

American scientists—most of them—are less excited about what is happening to the world than their European colleagues who are closer to the visible fire. The British Assocation for the Advancement of Science, England's counterpart to the American organization, has formally recognized the obligation of scientists to help government, industry, and other elements in everyday life. A major part of their meeting next September will be devoted to the public's welfare under the impact of science. There have been informal offers of scientific "hands across the sea" in the belief that the problem is international in scope.

The present trend of awakening scientific consciousness is expressed by one of America's pioneers in taking science to the people. He is Dr. William E. Ritter, 80-year-old emeritus biology professor of the University of California and honorary president of Science Service.

Democracy Needs Science

"Science is the main support to democracy," Dr. Ritter declared when asked what he considered science's greatest problem. "Popular government can not succeed without the support of science."

Such a belief on the part of the late E. W. Scripps, founder of the Scripps-Howard newspapers, led to a scientific partnership between him and Dr. Ritter some twenty years ago. One of the results of this was the founding in 1921 of Science Service as the institution for the popularization of science, serving the press with accurate yet interesting scientific news and interpretation.

Dr. Edwin G. Conklin, famous Princeton biologist and retiring president of the Association, also feels that serious and immediate attention must be given to making science safe for civilization and civilization safe for science.

The goal that transcends in importance every other objective of science, in the opinion of Dr. F. R. Moulton, eminent astronomer and AAAS permanent secretary, is "an intellectual and moral world in tune with the uniformities which we know as the laws of nature."

All this means that science and the other factors in our civilization must give more attention immediately to the human and psychological factors in our daily life. It is just as necessary to get soil control measures plowed into the dirt of the Dust Bowl as it is to determine what to do. We must see that superior children get superior chances in life. We must arrange that steel's engineers, capitalists, and workers utilize peacefully, with fatter dinnerpails, new metallurgical techniques.

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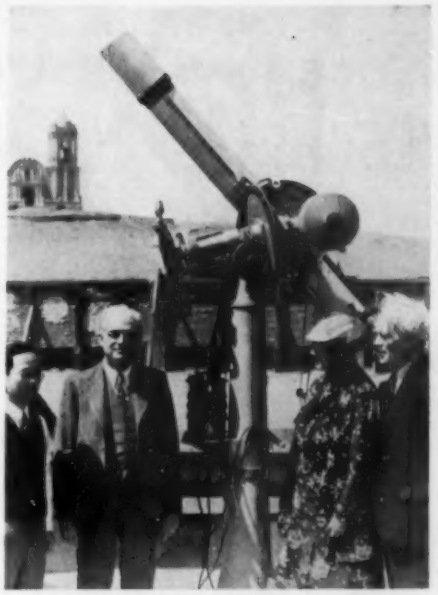

NEAR LATITUDE ZERO

Anybody who has ever had even a little to do with telescopes will notice something peculiar about this one. The polar axis, which must be kept rather sharply inclined at our relatively high latitudes, is nearly horizontal. For this is one of the instruments of the Hayden Planetarium-Grace Eclipse Expedition, near Trujillo, Peru. Members of the party present are: Dr. Yamamoto, Japanese astronomer, Dr. Godofredo Garcia, Peruvian, Mrs. Isabel Lewis of U. S. Naval Observatory and Dr. Clyde Fisher, Hayden Planetarium. Photograph by Te Ata.

COSMOLOGY

Contemplation of Space and Time Deflates Human Ego

EACH of us to himself is the center of the universe. What we do is the most important thing in the world—to us. It is good for deflation of the human ego to look at astronomic distances and wonder what is the universe, whence it came and whither it is going.

If space started in the way that Einstein imagined, if it is curved so that it bends back upon itself to form a volume of finite dimensions, and if space has been expanding for some thousands of million years, the universe must be at least that old.

Eddington has calculated that the original unexpanded space must have had a radius of 1,100 million light-years.

A model of space has been constructed by Jeans. Is is on the scale of two million light-years to the inch. Light traveling 186,000 miles per second would take two million years to travel a single inch in the model. The initial circumference of space in this model would be about a hundred yards; which may have expanded to a half mile by now. The farthest visible nebulae would be only about ten feet from the earth. Our own galaxy would be a pinhead, perhaps a tenth of an inch in diameter. The stars visible in the night sky to our unaided eyes would be contained in a mere speck of dust, about one six-hundredth of an inch in radius.

The sun, most important thing in the heavens to us here on earth, would be a single electron on this scale. And it would be impossible to represent the earth, because an electron is not divisible—it would be a millionth part of an electron. Mere man would be even more infinitesimal.

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GENERAL SCIENCE

Recently Destroyed Planets Source of Many Meteorites

"Super-Top" Spinning Out Life Secrets; New Device to Read Patient's Nervousness; No Water Found on Mars

MANY of the chunks of iron that fall flaming and roaring from the sky as meteorites are pieces of a couple of planets that met destruction quite recently, as geology goes—only 100 million years ago, or even less. That was late in the days of the dinosaurs here on earth, and not long before the "New Deal" that ushered in the age of mammals.

This startling piece of cosmic news was announced before the Denver meeting of the American Association for the Advancement of Science by Dr. William D. Urry of the Massachusetts Institute of Technology.

Like Stainless Steel

Dr. Urry has for some years been conducting research on the ages of terrestrial minerals, using a method worked out by Prof. F. A. Paneth of Imperial College, London, and himself. Now for the first time he has applied this method to substances of non-earthly origin—pieces of iron chemically very similar to stainless steel, that are found in all collections of meteorites.

The newest of the 25 iron meteorites thus far examined are these bits of "recently" smashed planets 100 million years old; the oldest is 2,900 million years old. The greater number of the specimens are more than 1,000 million years old, but none exceeds the estimated age of the earth itself, between 2,000 and 3,000 million years.

Craters on the moon, an astronomical and geological puzzle for many years, are due to violent explosions of meteorites that plunged into the airless surface of the earth's satellite with great energy. This theory of the lunar pockmarks was presented to the Society for Research on Meteorites by Dr. L. J. Spencer of London.

Only the hundred-mile blanket of air around the earth protects it from undue damage by meteorites that still bombard it. But Dr. Spencer believes that there must have been an earlier period during which these stray masses of the solar system were much more numerous.

There is little use looking for great masses of iron buried beneath the floors of great meteor craters like the one in Arizona, is the opinion of John D. Boon and Claude C. Albritton, Jr. These great gaping holes were probably made by projectiles from the sky, all right, but the projectiles exploded shortly after they hit, scattering their fragments far and wide.

Wartime experience shows what to expect from high-velocity projectiles, even if they contain no explosive charge, they pointed out. Bullets at a velocity of a half-mile a second explode when they hit anything solid enough, even at a glancing angle. And large meteorites fall at speeds approaching a hundred times that of a bullet. Pieces of meteoric iron have been found as much as six miles from the craters where the parent body struck and burst.

Said Mr. Boon: "Evidently when a giant meteorite hits it penetrates the earth for a short distance, like an airgun bullet penetrating a piece of cheese; then it explodes."

250,000 Times Gravity

A new scientific search for the real meaning of life, differentiating it from the stuff of the universe that is not alive, is about to begin with the ultra high speed top or centrifuge as the tool.

The new super-tops of science are whirled by powerful air blasts at great speeds so that they produce fields from 250,000 to 300,000 times the intensity of the gravitation, the force that holds things down to earth. This causes molecules of different weights to be separated cleanly.

Dr. Ralph W. G. Wyckoff, of the Rockefeller Institute for Medical Research laboratories at Princeton, N. J., stated that the whirling of disease-causing materials in the new ultra-centrifuge also promises "some day to indicate a new way in which the body can protect itself against disease."

The work of Dr. W. M. Stanley, also a Rockefeller researcher who demonstrated the disease-causing viruses of some plant and animal maladies are actually complex chemical molecules, has been widely acclaimed. Since then a cancer-like disease principle, some of the material involved in smallpox, and even a bacteriophage substance that seems to eat staphylococcus germs, have been shown to be sharply and uniformly sized molecules that the super-tops of science pick out even though these molecules are beyond the reach of human vision amplified by the microscope.

Because deadly diseases that still plague the human race are now considered virus-caused but unconquered—such ills as infantile paralysis, encephalitis, and even common colds—these new advances are extremely hopeful for the future.

Dr. Wyckoff declared, "A new field of research into the mechanism and control of disease has opened up the possibility of treating its cause as a pure chemical compound."

Measuring Nervousness

The nervous patient, unduly tense and excited when his physician begins an examination, can now have the exact state of his nervousness measured by a new instrument, the neurovoltmeter, described by Dr. Edmund Jacobson of the University of Chicago.

The neurovoltmeter is a simple instrument using a string galvanometer and fine, sharpened wire electrodes that are inserted into nerve or muscle tissue without undue discomfort. It will measure variations in electrical nervousness amounting to fractions of millionths of a volt.

The new instrument will permit the physician to keep track of effects of even the most delicate treatment upon the nervous and muscular system, Dr. Jacobson predicted. The study of mental disease will also be advanced by its use.

Mars continues to be a desert, defying astronomers' biggest telescopes and most delicate instruments to find any trace of water vapor on the rust-red surface of its middle part. So reported Drs. Walter S. Adams and Theodore Dunham, Jr., of the Mount Wilson Observatory.

Last April Mars was in especially favorable position for observation. The astronomers turned the great hundred-inch telescope on the planet, arming it with a nine-foot spectral grating to split the light reflected from its surface into the rainbow band of the spectrum.

Dark absorption lines appeared in the spectrum, part of them due to the "soaking up" of the planet's light by water vapor in the atmosphere of the earth. Particularly critical study was made to see if any of this light absorption took place in water vapor in the atmosphere

of Mars itself, before the light left on its long trip earthward. But of this the astronomers reported they could find "no evidence whatever."

Astronomy and botany are expected to cooperate in finding out the age of certain undated wooden statues of saints in Southwestern churches. These "santos," carved by Indian artizans in gratitude for petitions granted, are of all ages from early mission days to very recent, but they have been neglected by archaeologists, and nobody has any idea of how old the various types are.

Dating Sample "Santos"

Here is where "astrobotany" comes in. Dr. A. E. Douglass, noted for his studies on the age of prehistoric pueblos by comparison of tree-ring patterns in their timbers, is to be consulted on the tree-ring patterns in the wooden "santos" themselves. Over most of their bodies there are concealing layers of paint, but the flat bases on which they stand offer excellent points for examination.

After tree-ring chronology has established the ages of a few good sample "santos," resemblances in style of workmanship and conventions of religious symbolism will help to get the rest properly classified. The program for this study in recent archaeology of the Southwest was presented by Curator Mitchell A. Wilder of the Taylor Museum for Southwestern Studios at Colorado Springs.

2,000 "Sky Dogs"

New stratosphere records will be sought in an entirely new kind of stratosphere balloon, Jean Piccard, twin brother of strato-pioneer Auguste Piccard, announced. Mr. Piccard will undertake the long ascension under the lift not of a single giant balloon as heretofore used, but with a "sky dog team" of 2,000 small rubber pilot balloons.

"Since a single sounding balloon is able to carry a half-pound instrument to an altitude of twenty miles it is obvious that 2,000 sounding balloons could lift an air-tight gondola weighing 1,000 pounds to the same lofty position," he said. "It is my intention to construct such an assembly and to make scientific observations at the altitudes reached by sounding balloons.

"Before making such a flight I intend to test the possibilities of the composite balloon by making, in the near future, an experimental flight with eighty sounding balloons attached to an open gondola."

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FOLK STILL MARVEL AT METEORITES

America now has a special society for the study of meteorites, which took an active part in the Denver meeting of the Amerian Association for the Advancement of Science. But interest in these "thunder-stones" is much older than that; as witness this woodcut from an ancient German book, telling of the first one actually seen to fall, and collected afterwards. It plunged to earth on Nov. 16, 1492, near Ensisheim, Alsace. The Field Museum of Natural History has a piece of this meteorite.

GENERAL SCIENCE

Publishing Scholarly Data Is Vital World Problem

MILLIONS upon millions of words flow from the world's printing presses day by day.

In the face of this daily flood of the written word it may seem unnecessary to plead for and provide more and easier publication. Nevertheless to the scientific and scholarly world getting the findings of researches into the thought stream of civilization is a pressing problem.

The details of cosmic ray observations, the cryptic derivations of mathematical formulae, the intricacies of chemical determinations, the delving of a scholar of language into a tongue long dead, the columns of statistics compiled to chart the course of population—these data are of little interest to most of us although they are important to all of us. To publish such material in large editions is not necessary, but to have it available to those experts who need to use it is essential. Now, next year, or within a decade or so, a dozen or a few hundred scholars and experts will want this information.

A combination of photography and the microscope promises to make it possible to supply upon demand such records to the specialists. Upon strips of motion picture film are photographed the typed sheets, illustrations, and drawings of the research reports. An ordinary page shrinks to a mere inch in height. This "microfilm" costs about a cent a page and the scholar reads it with a projection or magnifying device.

Such a system of auxiliary publication for scholarly material is being operated by the newly organized American Documentation Institute. And by a similar process the rich and voluminous literature of the past in libraries is being made available.

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PHYSIOLOGY

Golfer's Energy Expenditure Would Warm Ton of Water

A GOLFER who plays 18 holes on a warm day gives off enough heat to raise the temperature of a ton of water one degree. He loses enough water through perspiration to fill two water glasses. These estimates, by A. H. Reinach, industrial expert on water and beverage cooling equipment, are cited as good reason why golfers enjoy a cool drink at the "nineteenth hole."

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CRYPTOGRAPHY

The "Black Chamber" of 1776

Patriots of Revolution Used "Sympathetic Ink" to Hide Military and Diplomatic Secrets From Watchful Foe

By DR. FRANK THONE

1776. A warm summer day in Philadelphia. Flies buzzed through the open windows, annoyed the delegates as they crowded forward nervously to sign the document in support whereto they pledged "their lives, their fortunes, and their sacred honour."

At last the task was finished. "Well, gentlemen," said one delegate, "we must all hang together now."

"Yes, or we shall all hang separately," spake the sententious voice of Poor Richard, through the lips of Franklin.

Which had too much of grim truth in it to make a jest of the laughing kind. Legally every one of them had with a stroke of the pen signed himself guilty of high treason. And if His Majesty's forces could have caught any of them, they well knew how swift and certain the penalty would be.

Battles of the Pen

Not many of the men who signed the Declaration of Independence bore arms afterwards to make it good. They were for the most part civilians, businessmen, landowners, men of affairs. They fought their fight for the new nation by exerting themselves to strengthen morale and finances at home, by patiently and diplomatically seeking friends and allies abroad.

How well they succeeded, in many European lands, is well witnessed by the array of brilliant foreign names that figure in the first pages of our history as a nation: Lafayette, von Steuben, De Kalb, Kosciusco, Kossuth, Paul Jones, and many another besides. And at last the French King's fleet, and his troops, and the bastions of Yorktown. Truly, these neck-risking men of the pen proved that even in war their weapon could deal telling blows to match any sword.

When used in war, the pen is always a two-edged weapon; if any of your writings fall into the hands of the enemy they will surely be used against you and your friends. So the Revolutionary generals of the pen had to exercise the greatest discretion.

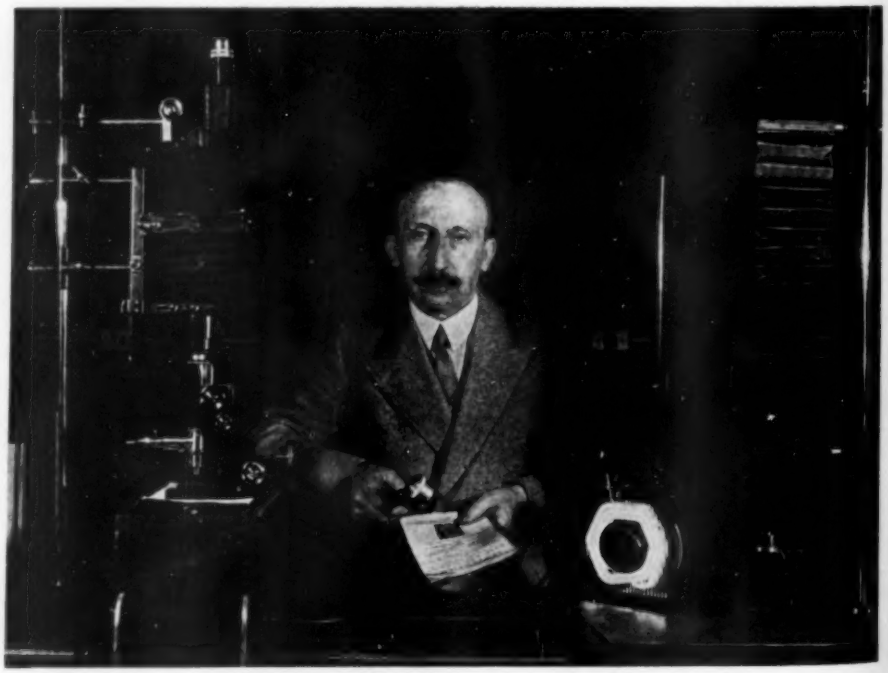
This was less easy than it is today, for most of the elaborate methods for the secret and safe transmittal of written messages known to the "black chamber" of a modern government had not yet been invented, or at any rate were not available to the Revolutionary ambassadors and secret agents serving abroad. There was a counterbalance to this handicap, however, in the apparent ignorance or carelessness of the British War Office in the matter of secret writings. Invisible inks of such chemical simplicity that they wouldn't escape detection five minutes in a present-day censorship laboratory apparently "got by" in those days with no difficulty at all.

Now, a century and a half after those stirring days, the methods of modern science are being used to make legible again some of those long-forgotten war messages. Ultraviolet, infrared, special cameras, microscopes, analytical chemistry, are among the means invoked—laboratory magics that would have made glisten the eyes of "the ingenious Dr. Franklin," could he have seen them.

Most recent to yield their secrets to the attack of science working in the aid of history are four letters from the correspondence of John Jay, later the first Chief Justice of the United States. Three of them were written to Mr. Jay, one was a letter of his own writing.

These letters have been subjected to the ingenious scrutiny of Dr. L. Bendickson of the Henry E. Huntington Library at San Marino, Calif. A report of the technical methods used and the results obtained is published in the quarterly, *The Franco-American Review*.

Dr. Bendickson found himself confronted with two quite distinct problems. One was the recovery of the messages written in secret or "sympathetic" ink, which had been developed and read, but which had faded to invisibility again, this time beyond reach of chemical recovery. The second problem was presented in plain black ink: Mr. Jay, the discreet, had scratched out certain possibly embarrassing passages by simply making wiggly up-and-down lines over them with heavy strokes of a pen. Parts of letters stuck out of this mess on both



SCIENCE'S AIDS TO DECIPHERING

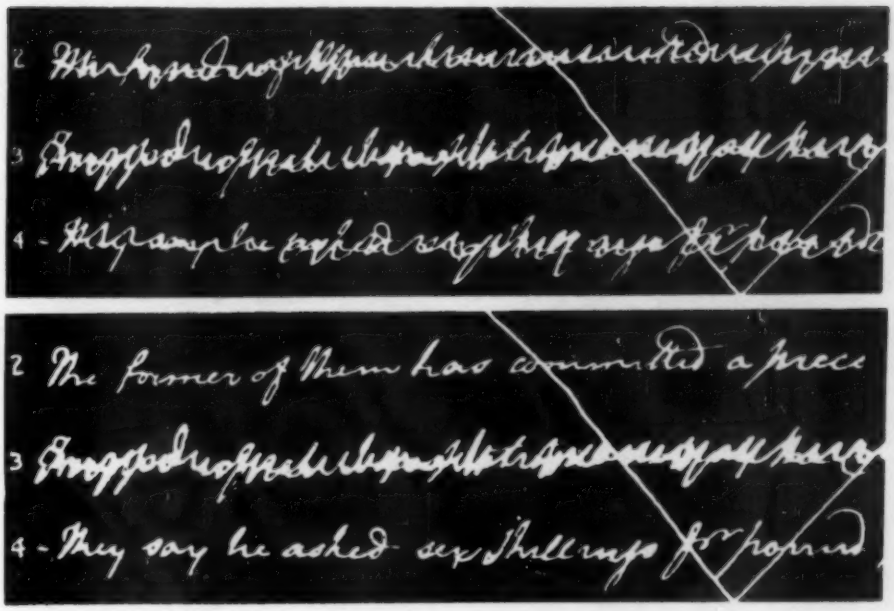
Dr. L. Bendickson, with the microscope, cameras, ultraviolet lamp, and other apparatus with which he deciphered the revolutionary letters.

sides, but the over-strokes distracted the eye and baffled all attempts to read.

Dr. Bendickson attacked the first problem partly with ultraviolet and infrared photography, partly with a reconstruction of eighteenth-century chemistry.

The method of writing in invisible ink used by John Jay's correspondents was naively simple. The writer would first pen an ordinary, chatty, casual letter about family and friends, telling nothing important at all, and appearing very innocent. This message would occupy only a small portion of a large sheet. The remainder, ostensibly blank, would carry the really significant message, written in invisble ink.

On receipt, the blank part would be sponged with a chemical solution that would react with the chemical in the invisible writing, bringing it out clear and black. The yellowed tint of the large sheets Dr. Bendickson examined showed clearly that it had had some kind of chemical treatment. In places brush-streaks were left from the swabbing with the developing solution. But the letters had all faded into invisibility again.



OBLITERATIONS CLEARED AWAY

Above: part of one of Jay's scratched-out letters as it appears when first photostated. Below: after painstaking removal of the obliterating lines. The text uncovers a minor wartime scandal of long ago.

Written in Fire

Dr. Bendickson placed one of these sheets under ultraviolet radiation. From the blank page the lost words leaped at him as though written in fire. The chemical salts, still impregnated in the paper, were caused to glow, or fluoresce, with visible rays by the impact of the ultraviolet. It was easy to get a photograph of this ultraviolet-induced glow.

A second letter proved more obdurate. When the ultraviolet lamp was turned on it, the whole sheet glowed purple, masking whatever writing was present. Unbaffled, Dr. Bendickson turned to the other end of the spectrum, and used infrared light, at an angle, to make a photograph. This time the lost writing came out.

With the aid of George D. van Arsdale, Pasadena chemical engineer, Dr. Bendickson discovered the ingredients of the invisible ink. The writer used a solution of tannic acid. The addressee sponged the paper with ferrous sulphate, or copperas. The iron in the copperas (which despite its name has no copper in it) combined with the tannic acid to form a dark compound, easily visible against the white paper.

The second problem, that of the writing crossed out with ordinary black ink, had to be solved in a different way. Through his microscope, Dr. Bendickson could see how the crossing-out strokes rode over the strokes of the writing. But photographing the whole letter through the microscope, almost stroke by stroke, would have been an exceedingly long, tedious, and expensive process.

Dr. Bendickson thought out a much easier way. First he made enlarged photostat copies of the troublesome passages. In photostating, the colors are reversed, so that the copies came out white on black, like chalk writing on a blackboard. The scientist now blacked out all the crossing-out strokes with a crayon or a brush and India ink. Then, with the original under the microscope to guide him, he pieced together the fragments of the original letters. He was able to rebuild the hidden sentences with very few gaps.

The messages from the long-gone past show that, then as now, trifles sometimes weighed importantly in the winning of a cause. One of the letters was from Benjamin Franklin to John Jay, when the latter was working for the Colonial cause in Spain. Mr. Jay had scratched out one passage, which Dr. Bendickson restored with his photostat process.

Benjamin Franklin was at that time in Passy, France; Jay, apparently, was not finding Spanish society too agreeable, at least personally. Franklin's deleted passage runs:

"This thought occured to me on hearing from the Princess Masserano that you and Mrs. Jay did not pass your time agreeably there and I think you would find this people of a more sociable turn besides that I could put you immediately into the society I enjoy here of a set of very amiable friends. In this case Mr. Carmichael might succeed you in Spain."

Outside of Spain, this was harmless enough. In Spain, its hint that the American representative didn't really like the people would certainly have "spilled the beans," had it come to official eyes. So the discreet Mr. Jay crossed it out.

Another deletion was of only two words, as it turned out, a man's name, Beverly Robinson, who had evidently played false to the Continental cause. The context reads:

"That vile, infamous, rascally, hypocritical Friend to America, ... , was their principal guide and assistant at P. Kill. I think it may be depended on, because several of the inhabitants say they saw him on the spot."

Here, the deletion of only the name left the passage without any possibly embarrassing significance. The general "cussing," left unobliterated, might have been applied to anybody.

John Jay himself sometimes burst through his bounds of caution and expressed himself pretty forcefully—and then made the record safe by getting the file of his own letters and censoring them. Dr. Bendickson has restored one paragraph in a letter from Mr. Jay to James Duane, in (*Turn to page 14*)

PSYCHOLOGY

Mature Women Have Best Chance for Married Bliss

"FORTY" has an unpleasant sound to both men and women, bringing with it fear of the loss of charm, sex attraction, mental alertness, and industrial usefulness. Need is felt for slogans, books and sermons to bolster the spirits and convince that "Life begins at forty," or that then comes "The prime of life."

Scientists, too, add their word of encouragement to older women. Marriage, it has been found, is much happier for mature brides than for those who wed in early youth.

Brides under 24 years of age find bliss in only 28 couples of each hundred, Dr. G. V. Hamilton and Kenneth MacGowan discovered in their famous study of marriage. Half of those between 25 and 29 (59 per cent) are happily married. Brides between 30 and 34 are more fortunate; 63 per cent of these more mature women become happy wives. Older brides are only slightly less likely to be happy, 57 per cent of all those over 35 finding joy in marriage.

Comparative ages of bride and groom have something to do with the marital happiness of the pair, these scientists found. Greatest chance of happiness exists when they are of equal age. A woman may find happiness with a much older husband, for he becomes a substitute for the father she has loved. Happiness is very unlikely when the bride is seven to eleven years older than the groom.

Science News Letter, July 3, 1937

ANTHROPOLOGY

Now We Can Worry Over Stone Age Race Problems

TIRED of hearing about fair-haired, superior Nordics? Tired of arguments over Yellow Perils and the rest of the modern race worries?

Look back, then, 100,000 years or more and try solving the earliest race problem of all—how races began.

Scientists digging up prehistoric man's bones are finding evidence that races developed earlier than supposed. What their skin color was then, or color of their hair, will never be known. Nothing is left of cave dwellers of the Old Stone Age except dry bones. But some of these bones bear marks of kinship with other human groups, plain enough for the expert prehistorian to begin to trace the story of racial evolution.

Caves at Mount Carmel, Palestine, have yielded skeletons of human beings who lived about 100,000 years ago, and who were nevertheless a type of *Homo sapiens,* modern species of man. This importance is given the tall, well-built cave men by the noted British anthropologist, Sir Arthur Keith, and his young American associate, Theodore McCown.

Mr. McCown explains:

"We have evidence to show that already at the end of the Riss-Würm interglacial period 100,000 years ago, modern races of man lived. The Palestine men are not generalized enough to be the ancestors of white, yellow, and brown races. We cannot see them developing into Mongolians. We can see them developing into some of the white European racial stocks."

While Palestine caves offer a glimpse at the white race's early evolution, other discoveries may show that the yellow race had its cradle in the East, and the black race in Africa, all very early.

Peking Man, whose bones from a Chinese cave are considered at least half a million years old, is sufficiently Mongol to be ancestor of Mongolians, in the opinion of Dr. Franz Weidenreich. And Africa's Kanjera Man, believed about 100,000 years old, has a skull that shows flattened features of a primitive Negroid type.

Science News Letter, July 3, 1937

SEISMOLOGY

Strong Earthquake Shock Near Peruvian Coast

A STRONG earthquake convulsed the earth's crust near the coast of northern Peru on Monday forenoon, June 21. Seismologists of the U. S. Coast and Geodetic Survey, collating telegraphic reports relayed through Science Service, determined an approximate location of the epicenter as in latitude 7.5 degrees south, longitude 80 west. The shock began at 10:13.1 a.m.

Earthquake observatories reporting were: Dominion Meteorological Observatory, Victoria, B. C.; the Seismological Laboratory, Pasadena, Calif.; Dominion Observatory, Ottawa; University of Michigan, Ann Arbor, Mich.; the stations of the Jesuit Seismological Association at Weston College, Mass.; Canisius College, Buffalo, N. Y., and St. Louis University, St. Louis, Mo.; and the stations of the U. S. Coast and Geodetic Survey at Ukiah, Calif., Tucson, Ariz., and Apia, Samoa.

Science News Letter, July 3, 1937

IN SCIENCE

ASTRONOMY—PHOTOGRAPHY

Eclipse Picture From Plane Shows Curious Reflections

See Front Cover

THE COVER picture of this week's SCIENCE NEWS LETTER is from an unique unretouched photograph, one of a series made by the Hayden Planetarium-Grace Eclipse Expedition. It is one of the occasional astonishing freaks that occur in photography.

It was made looking nearly directly west over the left wing of a Pan American Grace Airways airplane over the coast of Peru at an elevation of 25,000 feet, a second or two before totality of the solar eclipse of June 8. Although only a point of direct sunlight was still visible, this was sufficient to enter the camera lens and cause the central spot of light which appears in the print to be the complete disc of the sun, and to form in addition (through reflection between the several surfaces of the camera lens) a series of circular rings on the negative. In the foreground, 22,000 feet below, the last bit of sunlight is shining on a cloud bank 3,000 feet over the ocean.

The many other pictures of the expedition, though less spectacular than this, have more scientific value. The photograph was snapped by Major Albert W. Stevens.

Science News Letter, July 3, 1937

ZOOLOGY

Australia's "Live Teddies" Showing Signs of Comeback

KOALAS or native bears, appealing, furry little tree-dwelling animals that look like Teddybears, are staging a comeback in the wild. This gratifying result of 20 years of effort for protection of these unique animals is reported by the Wild Life Preservation Society of Australia.

Several groups of koalas have been seen in eucalyptus forests along the coasts of New South Wales, where it was thought they had been wiped out long ago by fur hunters. One colony has been reported within a few miles of Sydney.

Science News Letter, July 3, 1937

ENE FIELDS

MEDICINE

New Serum Saves Lives Of Childbed Fever Victims

A SERUM that probably saved the lives of 36 women suffering from childbed fever due to hemolytic streptococcus infection was described by Dr. Abraham F. Lash, of Chicago, to the American Medical Association. The serum is made by immunizing horses with the toxin produced by the streptococci taken from the woman suffering from the infection. It is injected into the muscles or veins, the amount depending on the severity of the infection. To be effective, it must be given early. It has no effect on peritonitis which may result from this infection during childbirth, so must be given before peritonitis sets in.

Only four of a group of 40 women treated with the serum died, Dr. Lash reported. In a control group of 33 patients not given the serum, 13 died.

Science News Letter, July 3, 1937

PHYSICS

Ice Cream in Dry Ice Leads to Cleaning Process

BECAUSE Robert M. Greenleaf, Los Angeles mechanic, took his family on a picnic some five years ago, the wool industry is now being stirred by an entirely new and revolutionary method of cleaning wool—the "frosted" process of wool cleaning.

Wool cleaned by this process is whiter, fluffier, stronger, and dyes deeper and brighter than wool cleaned by the more expensive conventional soap, water and picking processes. Already over a million pounds of wool have been cleaned by "frosting."

In this method, burs, thistles and vegetable matter which become entangled in the wool as the sheep browses for food over fields are literally frozen out of the wool by passing it on conveyers through a large "ice box" in which the temperature is kept from 30 to 50 degrees Fahrenheit below zero. Grease also is removed.

The "ice box" is a room 40 feet long, 12 feet wide and 12 feet high with walls, ceiling and floor made of nine-inch thick cork.

The low temperature freezes solid the burs and grease on the wool. Strangely, in such frozen state, their hold on the wool is loosened so that when the "frosted" wool is beaten or shaken, the dirt and impurities readily drop away. The whole process takes but a few minutes. About 1,500 pounds of wool can be cleaned in an hour. The cost is less than four-tenths of a cent per pound.

At the time Mr. Greenleaf went picnicking he was trying to design a machine that would get the spiral burs, so common in California wool, out of the raw wool directly.

At the picnic a woolen blanket was spread on the grass for a table cloth. There was ice cream for dessert, packed in "dry ice." In unpacking the cream, Mr. Greenleaf threw the "dry ice" on the blanket. That was a lucky pitch, for later when picking up the blanket preparatory to returning home, he noticed that the vegetable matter on the ground was frozen to the blanket and when he shook it, the sticks and leaves dropped away like icicles. Instantly the idea of removing burs from wool by freezing entered his mind.

He dashed home to try it; packed dirty, raw wool in "dry ice." It worked. Later a wool manufacturer became interested, as did certain engineers. A corner in an ice-making plant was rented to carry out large scale research.

Samples of frosted wool were sent to eastern wool manufacturers. Soon the Lowell Textile Institute of Lowell, Mass., set out to perfect the "frosting" process on a commercial scale. Today one of the largest worsted wool mills in that state is using the process.

Science News Letter, July 3, 1937

PALEONTOLOGY

Cave of Ancient Bones Found Near Boulder Dam

A CAVE containing hundreds of bones of ancient beasts and birds has been found high in the wall of Lake Mead, the artificial lake formed in connection with Boulder Dam. The fossil bones show that the cave was once frequented by ground sloths, big cats, goats, and numerous reptiles and birds. Fragments of hair and hide of the sloths have survived through the thousands of years since these extinct animals lived in America. A reconnaissance survey sponsored by the National Park Service in lower Grand Canyon found the cave.

Science News Letter, July 3, 1937

ENTOMOLOGY-PHYSICS

Microphone Hookup Detects Insects Working in Wood

LIKE a wartime listening post, where men with microphones and sharp ears pick up information about the enemy by listening to any sounds from the other side, is the instrument for detecting boring insects in timber devised by F. M. Colebrook of the National Physical Laboratory at Teddington, England. It consists of a soundproof box in which the suspected sample is placed, a microphone and amplifying setup, and headset or loudspeaker. Mr. Colebrook describes the gnawing of deathwatch beetle larvae as "a kind of muffled and intermittent rattle."

Science News Letter, July 3, 1937

PHYSIOLOGY

Slow-Action Insulin Makes Rats Grow Fat

RATS STUFF themselves and grow fat when they are given daily doses of the new, slow-action protamine insulin, Drs. Eaton M. MacKay and Richard H. Barnes of the Scripps Metabolic Clinic, La Jolla, Calif., reported to the Denver meeting of the Society for Experimental Biology and Medicine.

The male rats got so fat that they had difficulty in turning over when placed on their backs. The female rats got fatter than the males under the influence of the same dose of protamine insulin. In this, the rats resembled their human counterparts. Dr. MacKay pointed out that obesity occurs more often and is more severe among women than men.

This is the first time, with one exception, that scientists have been able to produce obesity in animals in order to have a means of throwing light on the condition in humans. The exception was an experiment of Prof. P. E. Smith of Columbia University who showed that chemical injury to the stalk of the pituitary gland was followed by remarkable obesity in rats.

The insulin-induced obesity is like that which occures in men and women who get too fat from overeating. The rats got fat from overeating under the stimulation of the protamine insulin. This is the new type of insulin which is giving considerable success in treating certain types of diabetes. Ordinary insulin does not make rats put on weight. When the protamine insulin injections were stopped, the rats stopped eating so much.

Science News Letter, July 3, 1937

MEDICINE

Heart Disease Likely Fate Of Young Men in Big Cities

WARNING to young professional and business men who live in large cities, work hard, exercise little, eat too much and smoke too much appeared in the report of Drs. R. Earle Glendy, Samuel A. Levine and Paul D. White of Boston at the meeting of the American Medical Association.

Heart disease before they are 60 years old is the likely fate of such young men.

More than one out of every hundred cases of coronary heart disease—1.6 per cent.—occurs in patients under 40 years of age, these physicians found. Young men are much more frequent victims than young women in the ratio of 24 to 1.

British Stock is Tough

Hoping to learn why so many young men are falling victims to what has generally been considered a disease of old age, the Boston physicians investigated the inheritance and living habits of a group of 100 young heart patients and compared these with similar information obtained from men and women of 80, 90 and 100 years of age.

Relatively far more of the older people were of British race stock, although the method of selection of this group for study and the time of immigration may have influenced this factor. Jewish people are more susceptible to heart and blood vessel disease, the study showed. The old men and women had longer-lived ancestors than the young heart disease patients.

These factors are beyond the control of the individual, but living conditions and habits which he can control evidently also play an important part in causing development of heart diseases.

Country life, for instance, is not as hard on the heart as the stresses of city life. Nearly three-fourths of the men and women past eighty years old lived in the country or small town, while nearly nine-tenths of the young heart patients lived in large cities.

The older persons all claimed to have been moderate eaters and while, as the doctors pointed out they may have forgotten the hearty appetites of their youth their body build was generally lean as compared to the heavy build of the young heart patients.

Over nine-tenths of the older people exercised considerably till well past middle age. The young heart patients had many of them been strenuously athletic in their youth but only few continued to exercise regularly.

A striking difference between the two groups was found in their use of tobacco, and this together with other evidence of the effect of tobacco, the Boston physicians believe, suggests that smoking plays an important part. A little over half the old group were smokers but only a few were heavy smokers. Over nine-tenths of the young group were smokers, more than half of them heavy smokers.

The two groups were more alike in their use of alcohol. A surprising finding was that severe infectious disease, generally supposed to impose considerable strain on the heart, had occurred, with the exception of diphtheria and pneumonia, more frequently in the older group than the young group. Even rheumatic fever and tonsilitis occurred less frequently in the younger group. The younger group, however, had more surgical operations than the older.

Irregular and few hours of sleep and nervous sensitiveness and nervous strain were other conditions found much more frequently in the young group which may have contributed to the early appearance of serious heart disease.

Silicosis Affects Heart

Heart disease occurred in nearly half of a group of war veterans suffering from silicosis, Dr. Philip B. Matz of the U. S. Veterans Bureau, Washington, D. C., reported. He said that silicosis, which occurs in persons working at dusty trades, is the greatest single occupational hazard in this country today.

The great seriousness of silicosis, Dr. Matz pointed out, is the fact that it is conducive to tuberculosis, which not only threatens the patient's life but makes him a hazard to his family and fellow workers.

Heart disease following silicosis results from the thickening of the fibers in the lungs which causes poor circulation of the blood and this in turn affects the heart.

Bed Means Death

Elderly persons who get sick must be gotten out of bed and back on their feet as rapidly as possible, in order to stall off death, Drs. Louis B. Laplace and J. T. Nicholson of Philadelphia told members of the American Medical Association.

Confinement to bed hastens death in persons over 60 years, they found. The reason is that remaining inactive and prone for long periods allows the blood to accumulate in the small veins and arteries. The total volume of blood is thus reduced and its circulation is further impeded by the hardening of the blood vessels that occurs in old age.

The blood therefore remains in the capillaries until it is forced out by contractions of the muscles, but a person confined to bed moves his muscles so little that the blood does not circulate enough. As a result, tissues degenerate, ulcers form, and the body is slowly poisoned by absorption of the products from the degenerated tissues. The patient sinks into stupor and the final invasion of the bacteria into the lungs causes the fatal pneumonia.

The way to prevent all this is to order elderly patients out of bed as soon as possible and while they must remain in bed to give them massage, exercise in bed, deep breathing and frequent shifts of position.

Vitamin Aids Gout

A vitamin discovery that sheds new light on gout and may prove a remedy for the ailment was reported by Dr. Martin G. Vorhaus of New York.

Cases of this disease were improved by doses of vitamin B_1, Dr. Vorhaus has found. Pain and swelling disappear, and even more striking, X-ray pictures of the affected joints show that new bone tissue is apparently formed.

This is the first time that anyone has ever discovered any effect of vitamin B_1, on bones, Dr. Vorhaus pointed out. Hitherto this vitamin was known only to affect nerves and the utilization of sugar. The discovery of its effect on bones is so new that Dr. Vorhaus and his associates have not yet decided exactly what is the relation between the vitamin and bones. They are reporting sixteen cases observed for longer than three months in order to stimulate other scientists to investigate the problem.

The discovery was made accidentally in treating neuritis with this vitamin, which is sometimes called the anti-beriberi vitamin because lack of it causes the oriental nervous disease known as beriberi. Some of the neuritis patients, instead of being helped by the vitamin as others had been, experienced severe

reactions and were for a time much worse.

The uric acid content of their blood rose, and this discovery led Dr. Vorhaus to continue the vitamin treatment in order to learn why the vitamin produced this effect. It turned out that all the patients had gout along with their neuritis, though the gout had not been suspected until its symptoms became acute after the vitamin dosage.

With more vitamin dosage, the patients improved greatly, and the uric acid content of the blood dropped back to normal. Not only gout of the big toe, but similar symptoms in other joints such as hands, feet, the spine, and the sacro-iliac were improved by the vitamin treatment.

Three-fourths of all persons suffering from early chronic arthritis—rheumatism to you—have symptoms in the feet, Dr. John G. Kuhns of Boston reported. The only way to prevent disability of these feet, Dr. Kuhns said, is to avoid putting weight on them until the pain and swelling caused by the disease subside. A plaster cast to hold the foot in a normal position at first, and then exercises to strengthen muscles and wide shoes with low, broad heels and firm thick soles were advised.

Arthritis Fads Denounced

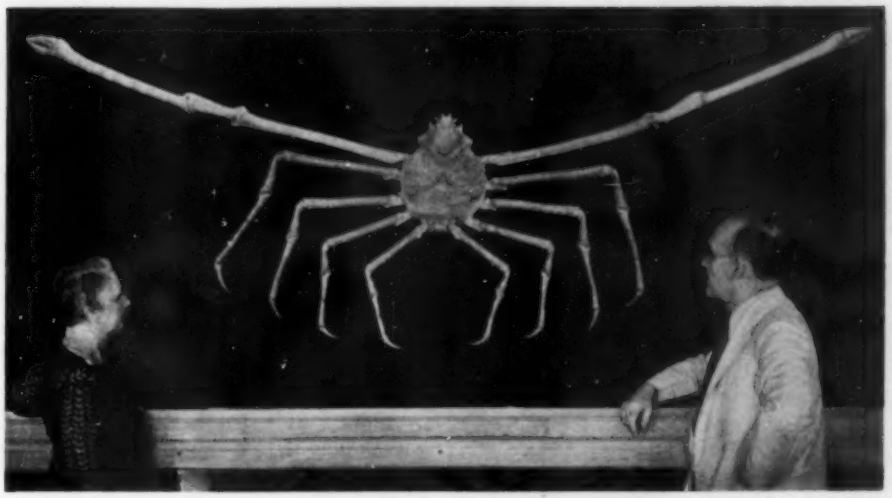
A denunciation of vaccines, sera, weird diets and all manner of gland therapy in treating hypertrophic arthritis was made by Dr. Walter Bauer of Massachusetts General Hospital and Harvard Medical School to the American College of Physicians.

No justification for such treatment exists, Dr. Bauer concludes from studies made by himself and Dr. Granville A. Bennett, because there is no evidence that the condition is caused by infection, gland disorders or disturbed chemistry.

The patients "should be told the exact nature of their disease and assured that they will not become cripples. Their treatment," Dr. Bauer stated, "should consist of all measures which will protect the joints from further damage."

Calling this condition arthritis is just as wrong as calling it rheumatism, it appears from Dr. Bauer's report. The condition is not, as the name would imply, an inflammation due to infection.

"Degenerative joint disease" is the name Dr. Bauer said describes the condition correctly. His studies show that the joint changes are degenerative and that they are found in practically all people past 50 years of age. They do not always produce symptoms.



ELEVEN-FOOT SPREAD

Regular gorilla among crabs is this giant crustacean from Japan, now on display at the Buffalo Museum of Science. Its claws have an eleven-foot reach, and its body is bigger than a man's head.

These changes represent nothing more than the wear and tear of daily use over the years and the minor injuries subsequent to such use. They can be produced in this manner in animals and they are found in persons whose occupation has called for unusual use of one joint and not of its mate. In such a case the long-used joint will show marked hypertrophic arthritis, whereas the mate will appear normal or show very little change.

Explaining how these changes come about, Dr. Bauer said:

"Experimental studies have shown that the gristle or articular cartilage covering the ends of all bones is different from other body tissues. It has a very poor blood supply and, in consequence, a very limited source of nourishment. Because of these existing deficiencies, articular cartilage differs from other body tissues in that it has a very limited ability to repair itself once it is incised or injured. Other body tissues when injured repair themselves completely in a very short period of time, whereas, in the case of articular cartilage, the marks of previous injury may be discernible for years.

"Because of this limited ability to repair itself, articular cartilage is unable to repair the minor injuries and traumata resulting from the wear and tear of daily use. Such minor injuries are additive and over a period of years result in marked thinning or complete loss of the cartilage and a protective overgrowth at the margins. Such changes are the characteristic changes of so-called hypertrophic arthritis."

Science News Letter, July 3, 1937

MARINE BIOLOGY

Giant Crab on Display At Buffalo Museum

BIGGEST of all its crustacean kin is the giant crab of Japan, a specimen of which has just been placed on display at the Buffalo Museum of Science. With its eight spine-hooked legs and the eleven-foot reach of its claws, it is an awesome sight.

Actually, about the only persons who ever get to see these huge crabs alive are the Japanese fishermen, who value them for both meat and carapace or shell. The shells they paint with fantastic faces and hang them up on their houses to frighten away evil spirits.

For all its formidable appearance, the giant crab is both retiring and inoffensive. It lives in deep water (the Buffalo Museum specimen was caught half a mile below surface) and it seeks further concealment by planting bits of living sponge, coral, and other sessile animal forms on its back. Despite this camouflage, however, it is found and devoured by predacious fish and octopuses.

Science News Letter, July 3, 1937

SEASICKNESS
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SEASICKNESS

MEDICINE

Step Taken Toward Solving Question of Dropsy's Cause

Spinach Defended as Adequate Iron Source; New Rickets-Preventing Factor Found in Milk

AN IMPORTANT step toward solution of the question of what causes dropsy and one form of kidney disease was reported by Dr. Lillian Eichelberger of the University of Chicago at the meeting of the Federation of American Societies for Experimental Biology.

In dropsy, often associated with kidney and heart disease, watery fluid gets into the body tissues and causes swelling. Nature has fixed it, Dr. Eichelberger explained, so that ordinarily this cannot happen. Otherwise everyone would swell up after drinking water or beer or other fluid.

For the first time the condition of faulty water-handling mechanism, known as hydronephrosis, has been produced in animals in the intermediate as well as the final stages, Dr. Eichelberger reported. As a result, scientists can now probe into the underlying cause of the condition with some hope of solving the problem.

Earlier Detection

Hydronephrosis occurs in some cases of prostate disease and sometimes in pregnancy. Water backs up into the kidneys because the outlets from them are blocked and the pressure destroys the kidneys. It also occurs in renal rickets, an ailment that afflicts children of 10 or 12 years. A disturbing feature of this condition is that the children are without any signs of kidney disease until the last, fatal stage. Dr. Eichelberger's research may lead to ways of detecting the disease earlier and possibly remedying it.

Alkalinity may be a factor in dropsy. Dr. Eichelberger reported she could get much more fluid into the tissues of the animals if she made their bodies alkaline.

Contrary to previous opinion, Dr. Eichelberger also found that a thin person has no more water in his muscles than a fat person.

Spinach was vindicated at a late session of the meeting. Early reports there had showed that only about one-fifth of the vegetable's iron content was in such form that the human body could use it.

Dr. C. A. Elvehjem, of the University of Wisconsin, reminded the scientist-physicians that the total content of iron in spinach is so high that one-fifth of it makes a sizable amount.

An unsuspected rickets preventing element in milk, present after the removal of all traces of the known anti-rachitic vitamin D, was announced to the Society of American Biological Chemists at Memphis by Profs. John M. W. Bunker and Robert S. Harris of the Massachusetts Institute of Technology.

Byproduct of Research

The discovery was a paradoxical byproduct of research. Instead of seeking an anti-rachitic element, the two biologists for the past three years attempted to develop a diet of uniform effectiveness for producing the disease in laboratory rats.

The new factor may make valuable for human and animal food large quantities of casein, a waste product of milk processing which represents one of the great losses in agriculture.

The scientists sought a protein substitute for ground whole corn, the recognized protein constituent of diets used for producing rickets. For some as yet unexplained reason, not all corn will produce rickets.

They experimented with casein, principal milk protein, preparing it absolutely free of all known forms of vitamin D. They naturally expected rats fed on this diet to develop rickets. Instead they thrived with no trace of the disease. In a further effort to make casein rickets-producing the two biologists predigested it with enzymes and alkalies. But the rats still thrived. The scientists then began changing the calcium-phosphorus ratio in the rat diet. Diets calculated to produce rickets in its severest form had no effect.

The inevitable conclusion was that milk has a hitherto unsuspected anti-rachitic property. Attempts are now under way to find out what part of the casein protects.

Science News Letter, July 3, 1937

PUBLIC HEALTH

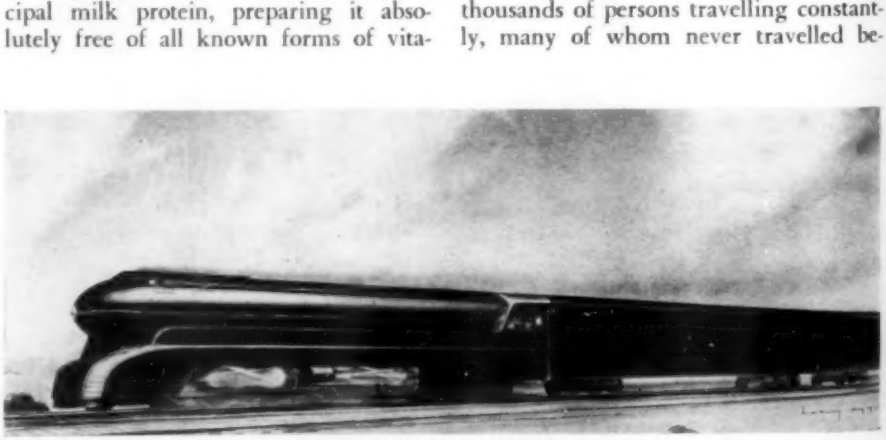
Trailers on Highways Are Health Jekylls-and-Hydes

AUTO trailers now luring city people out for a summer's gypsying on the highways of the nation give to the casual observer no hint of sinister deeds, but they have a Jekyll-and-Hyde personality. As they travel the highways they can roll up benefit or disaster to health.

Acting as veritable Dr. Jekylls, the trailers can increase the physical well being of a large part of the population by getting these people outdoors and in sunshine much more than would otherwise be possible.

Acting as Mr. Hydes, they can jeopardize the health not only of those who ride and live in them but of whole communities through which the trailers pass. Here is the picture of Mr. Hyde in a trailer as worried health officers see him:

Communicable diseases—typhoid fever, smallpox, influenza and all the rest—are spread fastest by travel. With thousands of persons travelling constantly, many of whom never travelled be-



STREAMLINED FOR POWER AND SPEED

fore, the spread of disease may be greatly accelerated.

Trailer tourists cannot depend on the milkman or the city water works to supply them with safe milk and drinking water. They must find these for themselves. Penalty for not using a safe supply may be a serious case of typhoid fever or some other ailment from contaminated water or milk.

Gravest danger of all is the trailer tourist's garbage and other waste. If this is not properly disposed of, it will scatter disease along the highways and in tourist camps, villages, farms and cities.

A recent conference of health officers suggested many ways to meet this danger. Among them was the radical step of requiring health department approval of every trailer's sanitary arrangements before a license is issued.

In the end, however, it is up to the trailer tourist to make his trailer a Dr. Jekyll instead of a Mr. Hyde. Specific directions for this can be obtained from any health department.

Science News Letter, July 3, 1937

ENGINEERING

Steam Equals Electricity In Speed and Heavy Power

THE BATTLE between electricity and steam as the motive power in America's railroad locomotives has entered a new phase with the announcement that a 110-foot long giant of 6,000 horsepower is being planned by the Pennsylvania Railroad. Hauling heavy 14-car trains at 100 miles an hour is the goal of this newest locomotive and, when achieved, will make steam equal with electricity in combining speed and heavy duty power.

Engineers of the railroad and of the Baldwin, American and Lima Locomotive Companies have cooperated on the new design which, from artist's conceptions, looks like a giant, blunt-nosed lead pencil on wheels. There is no visible smokestack and all surfaces are as smooth as those on the more familiar Diesel-powered Zephyrs and Comets that have caught the public's train-traveling fancy.

One hundred and ten feet long, including the tender, the proposed steam locomotive will burn soft coal, fed automatically so that its engine crew will still remain at two.

It will carry 26 tons of coal and 25,000 gallons of water and have a cruising radius, to borrow aviation's phrase, of 100 miles.

Science News Letter, July 3, 1937

PUBLIC HEALTH

Dust Fights Dust in New Silicosis Control Method

PREVENTING silicosis by adding dust to the air sounds like a strange paradox, since silicosis is the lung disease resulting from breathing dusty air containing silica particles. Yet prevention of this disease, to which a million or more American workers are exposed, may in future be accomplished by fighting dust with dust.

This is the possible solution of the silicosis problem suggested by results of a mineralogical study by R. C. Emmons, professor of geology, and Ray Wilcox, of the University of Wisconsin.

The idea is to add protector mineral dusts to the air containing silica dust. Scavenger cells function poorly in removal of colloidal silica or any pure mineral dust. However, inhalation of one or more additional dusts, whose electrical charges are opposite to that of the noxious material, may result in aggregation of all dusts into large particles which can be normally removed before chemical action occurs.

Silicosis, prevalent in atmospheres heavily laden with siliceous dusts, is apparently caused by the chemical reaction of mildly alkaline lung fluids on the dust particles, producing a colloidal suspension of silica which collects on the cell walls and destroys living tissue. Based on experiments using beef and human blood sera in an attempt to approximate actual lung conditions, the suggestion is made that other minerals, particularly sericite, biotite and talc, may be susceptible to the same chemical reaction and consequently act as causative agents for silicosis.

Mixture of protector dusts with contaminated air can prove effective and economical only when preceded by a microscopic examination of the noxious dust to determine size distribution and mineral content.

The study by the Wisconsin geologists was undertaken after recognition of the fact that modern preventive methods are expensive and incompletely successful, and in an attempt to substantiate the idea that minerals other than silica and asbestos can cause the disease.

Science News Letter, July 3, 1937

SOCIOLOGY

Child Marriages Banned In 39 States and D. C.

PUBLIC feeling aroused by publicity given to a number of child brides early this year has apparently resulted in general tightening of regulations to prevent such marriages of very young children.

A survey by the U. S. Children's Bureau shows that the legal minimum marriage age for children has now been raised above the common-law age in 39 states and the District of Columbia. In all but nine states the youngest age at which a girl can legally marry is between 14 and 16 years. For boys in these states the legal minimum marriage age varies from 16 to 18 years. The highest statutory minimum age, found in New Hampshire, is 20 for boys and 18 for girls.

In Colorado, Florida, Idaho, Maryland, Mississippi, New Jersey, Rhode Island, Tennessee and Washington the common-law marriage age still applies and boys of 14 and girls of 12 years are considered able to give valid consent to marriage.

Science News Letter, July 3, 1937

●RADIO

July 6, 4:15 p.m., E.S.T.

BABYLONIANS: FATHERS OF SCIENCE— Dr. Waldo H. Dubberstein, Oriental Institute of the University of Chicago.

July 13, 4:15 p. m., ES.T.

FOUR RULES OF THE ROAD — H. C. Dickinson of the National Bureau of Standards.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

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ORNITHOLOGY

NATURE RAMBLINGS

by Frank Thone

The Real Eagle

PROUD emblem of America's might, the noble eagle seeks the height, or something to that effect in the good old-fashioned Fourth-of-July orations. We learned from them that the bald eagle is a fierce, courageous bird of prey, that builds its nest ("eyrie" in oratornithology) on a lofty cliff in the heav'n-kissed mountains of the Greeeat West, and will defend that home, sir, with its very life.

Impartial scientific investigations of real live bald eagles deflate that account quite a bit. Not that our eagle is debunked, exactly, but we learn that a lot of things we knew about the eagle consisted of "facts that weren't so."

Results of long study of eagles, and compilation of the studies of other scientists, are presented in a new Smithsonian Institution book, written by Arthur Cleveland Bent of Taunton, Mass.

True, the bald eagle is a bird of prey. But he is also not fond of the hard work involved in preying, and lives mostly on fish cast ashore dying or dead, or taken away from a smaller fish-catching hawk, the osprey. He can do his own fishing, but not so cleverly as the osprey, so he prefers to rob him.

When fish are scantily available, as in winter, the eagle does turn to true bird-of-prey tactics. He takes any bird or mammal that he can handle, and that runs up as big as Canada goose. Despite his size, he is an athlete in the air, often turning upside down and diving under his victim to strike from beneath.

He does not build his home on a cliff nearly as often as on top of a tall tree, even in the Rockies. And there are far more bald eagles in Florida, least cliffy of states, than anywhere else in the Union. Eagles have even been known to build their nests right at ground level.

And when a human intruder comes, says Mr. Bent, the bald eagle does not defend his nest. He just plain vacates.

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which he details a wartime business transaction on the part of a certain Messrs. Aslop and Lewis that rather looks like profiteering. At any rate, the patriots of the time were wroth enough about the affair.

Some of the letters written in invisible ink were affairs of more than ordinary danger, for they kept John Jay advised of efforts on behalf of the Colonies in London itself. His own brother was a rather notable English physician, Sir James Jay. Letters from him, and from other relatives and friends in England, were passed, open, through the British Post Office, where apparently no suspicion was aroused of possible secret writing. These were often sent to fictitious addresses, where Mr. Jay picked them up. Extreme caution had to be observed at that time, because although the French were willing to aid in the discomfiture of their old enemy, England, the two governments were still formally at peace.

Thus, a letter from Silas Deane, then secret American agent in Paris, to John Jay, was mailed from a fictitious Thomas Johnson to an equally fictitious Thomas Smith. The visible part was, as usual, casual and innocuous. The part in secret writing went into some details about the delicate arrangements, all the more dangerous because they still had to be kept secret, for stirring up French aid for the struggling Colonies.

Plenty of Callers

Part of the secret message reads: "Let me entreat you to send me some instructions and powers in proper form, if you design I shall represent the United States in any tolerable character. I am, my dear friend, in a most critical situation and the anxiety, I daily undergo thro want of intelligence, will neigh distract me and the more so as everybody here has taken it into their heads I am plenipotentiary. In consequence of which I have a levee of officers and others every morning as numerous, if not as splendid, as a prime minister.

"Indeed I have had occasionally dukes, generals and marqueses and even bishops, and comtes and chevaliers without number, all of whom are jealous, being out of employ here or having friends they wish to advance in the cause of liberty.

"Good people in this country expect the new regulation of your government's universal toleration in religion will be one of the cornerstones of your building. This will endear you to all the good people in Europe and be one of the most noble and just steps that can be taken."

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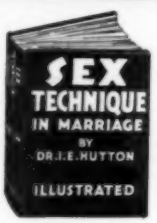

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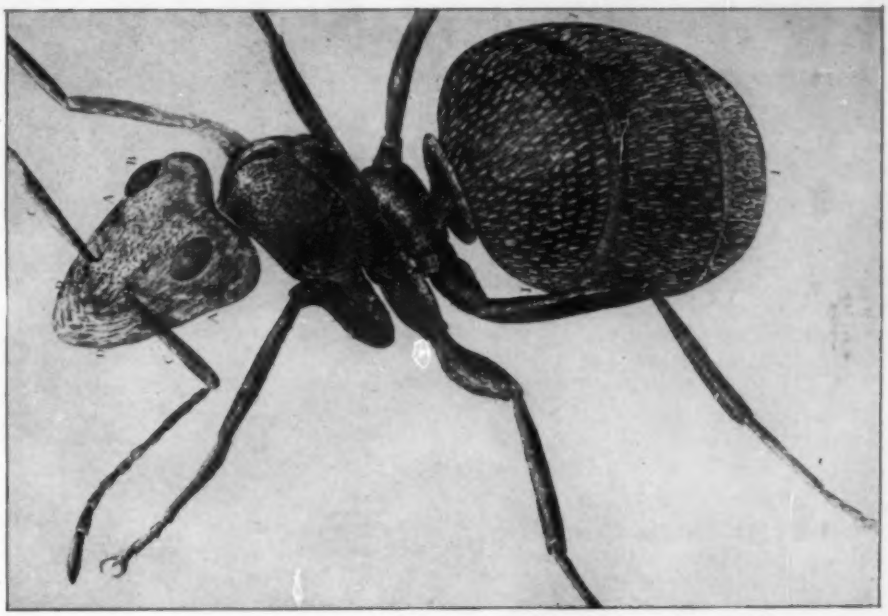

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•First Glances at New Books

Chemical Industry

MAN IN A CHEMICAL WORLD, THE SERVICE OF CHEMICAL INDUSTRY — A. Cressy Morrison — *Scribner's,* 292 p., illus., $3. As an outgrowth of the celebration in 1935 of the three-hundredth anniversary of the birth of chemical industry in the United States, there have been brought into this book hundreds of instances in which chemistry is serving our civilization. It will provide fact and inspiration to students and laymen and as a broad summary it will interest the chemists, industrialists and others immediately concerned with chemistry.

Science News Letter, July 3, 1937

Anthropology

OKLAHOMA DELAWARE CEREMONIES, FEASTS AND DANCES—Frank G. Speck—*Univ. Pa. Press, for Amer. Philosophical Soc.,* 161 p., illus., $2. The author is professor of anthropology in the University of Pennsylvania. Memoirs of the American Philosophical Soc., Vol. VII.

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Engineering

MACHINE SHOP OPERATIONS—J. W. Barritt—*American Technical Soc.,* 850 p., $5. A binder containing over two hundred eighty descriptions of how to do jobs in a machine shop. These are typical of hundreds of major operations that skilled mechanics are called upon to do.

Science News Letter, July 3, 1937

Electricity

THE CANNING PRACTICAL HANDBOOK ON ELECTRO-PLATING, POLISHING, BRONZING, LACQUERING AND ENAMELING (13th ed.)—*W. Canning, London (Chemical Pub. Co. of N. Y.),* 359 p., illus., $2.50. The thirteenth edition of a handbook, first edition of which appeared as long ago as 1899.

Science News Letter, July 3, 1937

Engineering

HARDNESS OF METALS—F. C. Lea—*Charles Griffin (Lippincott),* 141 p., $6. An investigational study giving results telling how accurately it is reasonable to demand hardness to be measured by any particular method. The author is dean of the faculty of engineering at the University of Sheffield, England.

Science News Letter, July 3, 1937

Anthropology

A CONTINENT LOST—A CIVILIZATION WON: INDIAN LAND TENURE IN AMERICA —J. P. Kinney—*Johns Hopkins,* 366 p., illus., $4. A detailed consideration of the Indian problem from the standpoint of their holdings of land, written by one who has studied Indian affairs at first hand in the service of the Indian Bureau.

Science News Letter, July 3, 1937

Anthropology

HOPI JOURNAL OF ALEXANDER M. STEPHEN—Elsie Clews Parsons, ed.—*Columbia Univ. Press,* 2 vols., 1417 p., illus., $10. A remarkable record of Pueblo Indian Life in eastern Arizona during the early 1890's, as recorded by a Civil War veteran and graduate of the University of Edinburgh who lived among them.

Science News Letter, July 3, 1937

Parapsychology

BEYOND NORMAL COGNITION: AN EVALUATIVE AND METHODOLOGICAL STUDY OF THE MENTAL CONTENT OF CERTAIN TRANCE PHENOMENA—John F. Thomas —*Bruce Humphries,* 319 p., $3.50. This volume is a report of experiments in psychic research performed in collaboration with Drs. J. B. Rhine and Louisa Rhine at Duke University. It is prefaced by a Foreword by Dr. William McDougall, also of Duke. The author's interest in psychic research was aroused by the shock of a sudden bereavement in the death of his wife some eleven years ago.

Science News Letter, July 3, 1937

Psychology

A TIMELY WARNING—Ernest Austen —*Bruce Humphries,* 288 p., $2. The author, who is a member of the Bar in the District of Columbia, writes here upon his varied interests, including the training of youth, diet, sex and economics.

Science News Letter, July 3, 1937

Educational Psychology

PRINCIPLES OF EDUCATIONAL PSYCHOLOGY—W. D. Commins—*Ronald Press,* 596 p., $3. This textbook by an Instructor in Psychology at the Catholic University of America is a part of the psychology series edited by Dr. Albert T. Poffenberger.

Science News Letter, July 3, 1937

Language

THE LANGUAGE OF ECONOMICS AND ETHICS—Robert S. Hale—*Bruce Humphries,* 154 p., $2. As the author points out, an agreement as to the meaning of words used in an argument would often settle the dispute. This discussion of the words used in economics and ethics is by no means dry or technical.

Science News Letter, July 3, 1937

Mathematics

MATHEMATICS FOR MODERN LIFE—Joseph P. McCormack—*Appleton-Century,* 448 p., $1.32. High school students that use this text will see that mathematics has something to do with everyday life. For instance, the first plunge into the subject is through the explanation and use of graphs; and logarithms are brought down to the level of the immature student and he is taught to use the slide rule. The author is chairman of the Department of Mathematics of the Theodore Roosevelt High School, New York.

Science News Letter, July 3, 1937

Psychology

MODERN DISCOVERIES IN MEDICAL PSYCHOLOGY — Clifford Allen — *Macmillan,* 280 p., $2.75. Here is an impartial description of many modern psychological views as they apply to the practice of medicine. The book is rewritten from a series of lectures given under the auspices of the University of London. It is not couched in technical terms and will probably interest anyone who wishes to straighten out in his mind the various theories of such men as Freud, Adler, Jung, Janet, Kretschmer and Pavlov.

Science News Letter, July 3, 1937

Education

THE SCHOOL AT THE CROSSROADS—Thurra Graymar—*Funk & Wagnalls,* 241 p., $2. William McAndrew, well-known former Superintendent of Schools at Chicago, has written the preface for this interesting book on educational philosophy. Those who pay the taxes that run the public schools, and the parents of school children, as well as teachers, will find much food for thought in this book.

Science News Letter, July 3, 1937

Thermodynamics

AN INTRODUCTION TO MODERN THERMODYNAMICAL PRINCIPLES—A. R. Ubbelohde—*Oxford Univ. Press,* 131 p., $3. Describing briefly the formal applications of thermodynamic functions to the calculation of physico-chemical equilibria, this book is based upon lectures delivered at Oxford.

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Chemistry

A LABORATORY GUIDE FOR ORGANIC CHEMISTRY,— E. Wertheim — *Blakiston,* 524 p., $2. Experimental material for a year's course in elementary organic chemistry by the professor of organic chemistry at the University of Arkansas.

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